at least one temperature measurement element formed by a second structure in the metal layer, wherein at least one of:

a top sandwich system including at least one first silicon oxide layer between at least two first silicon nitride layers is formed above the metal layer; and

a bottom sandwich system including at least one second silicon oxide layer between at least two second silicon nitride layers is provided below the metal layer.

20. (New) The mass flow sensor as recited in claim 19, wherein at least one of the top and bottom sandwich system includes:

a silicon oxide layer;

a silicon nitride layer on top of the silicon oxide layer;

another silicon oxide layer on top of the silicon nitride layer;

another silicon nitride layer on top of the other silicon oxide layer; and

a further silicon oxide layer on top of the other silicon nitride layer.

21. (New) The mass flow sensor as recited in claim 19, wherein:

the bottom sandwich system in an area of the frame includes a silicon oxide layer as the bottom layer; and

the silicon oxide layer is removed in a recess area.

22. (New) The mass flow sensor as recited in claim 19, wherein at least one layer is formed by one of a PECVD operation, an LPCVD operation, and another CVD operation.

23. (New) The mass flow sensor as recited in claim 19, wherein at least one of the top and bottom sandwich systems includes a silicon carbide layer.

REMARKS

Claims 1, 3-13 and 19-23 are pending in the present application after this amendment cancels claim 2 and adds new claims 19-23. The Examiner has withdrawn from consideration claims 14-18 based on a constructive election. Claims 1, 4, 5, 7-11 and 13 stand rejected under 35 U.S.C. § 102(b). Claims 2, 3, 6 and 12 stand rejected under 35 U.S.C. § 103(a).

Attached hereto is a marked-up version of the amendments showing the changes made to claims 1, 3, and 8-12 captioned "Amendment Version With Markings." It is believed that this Amendment does not raise new issues that would require further consideration and/or search, and also does not raise the issue of new matter. It is also believed and respectfully submitted that this Amendment places the application in better form for appeal by materially reducing or simplifying the issues for appeal. Applicants respectfully request reconsideration of the present application in view of this response.

I. THE 35 U.S.C. § 102(b) REJECTIONS SHOULD BE WITHDRAWN

Claims 1, 4-5, 7-11, and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,393,351 to Kinard et al. ("Kinard"). Claim 1 has been amended to include the features of claim 2, namely, that "the moisture barrier is formed at least in part by a nitride layer."

To reject a claim under 35 U.S.C. § 102, the Office must demonstrate that **each and every claim limitation is identically disclosed** in a single prior art reference. (*See* Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991)). "The identical invention must be shown in as complete detail as is contained in the claim." M.P.E.P. § 2131. Applicants respectfully submit that the Kinard reference does not disclose each and every element of the claimed invention.

The Office Action admits that Kinard fails to utilize a nitride layer as a moisture barrier. (Office Action, page 5, lines 2-3). Therefore, it is respectfully submitted that amended claim 1, and claims 4-5, 7-11, and 13 which depend from claim 1, are not anticipated by Kinard. It is therefore respectfully requested that the 35 U.S.C. § 102(b) of claims 1, 4-5, 7-11, and 13 be withdrawn for at least the foregoing reasons.

II. THE 35 U.S.C. § 103(a) REJECTIONS SHOULD BE WITHDRAWN

Claims 2, 3, 6 and 12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kinard in view of U.S. Patent No. 5,852,239 to Sato et al. ("Sato"). Claim 2 has been cancelled and the features of cancelled claim 2 have been incorporated in amended claim 1, and therefore the rejection of claim 2 is addressed herein with respect to amended claim 1. Applicants respectfully submit that claims 1, 3, 6 and 12 are in condition for allowance for at least the following reasons.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103(a), not only must the prior art **teach or suggest each element of the claim**, but the prior art must

also **suggest combining the elements in the manner contemplated by the claim**. *See* Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990), cert. denied, 111 S. Ct. 296 (1990); In re Bond, 910 F.2d 831, 834 (Fed. Cir. 1990). The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. M.P.E.P. §2142. To establish a *prima facie* case of obviousness, the Examiner must show, *inter alia*, that there is some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, **to modify or combine the references** and that, when so modified or combined, the prior art **teaches or suggests all of the claim limitations**. M.P.E.P. §2143. Applicants respectfully submit that these criteria for obviousness are not met here.

Independent claim 1 has been amended to include the features of claim 2, and now recites a mass flow sensor including, *inter alia*, a frame, a metal layer arranged above the frame, and **a moisture barrier arranged above the metal layer and formed at least in part by a nitride layer**. As stated in the specification, the stability of the membrane of a mass flow sensor may be improved, for example, by arranging a moisture barrier above the metal layer of the mass flow sensor, as recited in claim 1. (Specification, page 1, lines 12-14). In addition to providing improved stability, the moisture barrier is operable to reduce an amount of damaging moisture that may reach the membrane of the mass flow sensor. (Specification, page 1, lines 17-20). For this purpose, the moisture barrier may include, for example, a nitride layer produced by an LPCVD or PECVD process, or a silicon carbide layer produced by a PECVD process. (Specification, page 2, lines 1-5).

Although the Office Action admits that Kinard fails to utilize a nitride layer as a moisture barrier, the Examiner asserts that one of ordinary skill in the art would have readily recognized the advantages and desirability of rearranging and utilizing the nitride layer as a moisture barrier to further protect the detector from environmental hazards that may cause malfunction. (Office Action, page 5, lines 2-8). It is respectfully submitted that there is no suggestion in the prior art to modify Kinard in the manner described in the Office Action to arrive at the invention of amended claim 1. In In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002), the Court considered a claim directed to a method of automatically displaying functions of a video display device. In rejecting the obviousness rejection based on a combination of two references, the Court stated that the Examiner's "conclusory" statements regarding motivation to combine "do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority." Id. at 1434. According to the Court,

the rejection by the Board of Appeals of the need for any specific hint or suggestion in a particular reference amounted to an "[o]mission of a relevant factor" justifying reversal. Id. at 1435. The Court further added that the "common knowledge and common sense" standard on which the Board of Appeals relied, "even if assumed to derive from the agency's expertise, [does] not substitute for authority when the law requires authority." Id.

The Kinard reference purportedly concerns inexpensive multi-junction thermal converters. (Kinard, Abstract). In the embodiment described with reference to Figure 3 of Kinard, the multi-junction thermal converter 200 includes: a silicon oxide layer 260 arranged above a dielectric substrate 202; a silicon nitride layer 262 arranged above the silicon oxide layer 260; and a heater element 206 and thermocouples 208, 210 provided above a silicon oxide layer 264. (Kinard, col. 10, line 63 to col. 11, line 14). Additionally, Kinard states that protective silicon dioxide layers 266, 268 may also be provided.

The Office Action cites In re Japikse, 86 U.S.P.Q. 70, in support of the rejection of claim 2, alleging that it has been held that rearranging parts of an invention involves only routine skill in the art. However, this is an incorrect application of the Court's holding. In In re Japikse, the Court of Customs and Patent Appeals affirmed the Examiner's rejection of certain claims directed to a hydraulic power press based on a "lack of invention" over the prior art. The In re Japikse Court found no error with respect to the rejection of claims based on a rearrangement of a means for starting the press and affirmed the Board of Appeals's holding "that there would be no invention in shifting the starting switch disclosed ... to a different position since the operation of the device would not thereby be modified." In re Japikse, at 73. The Court in In re Japikse considered the rearrangement of parts that **performed the same function**, namely, the starting switch. In contrast, with respect to the present invention which claims a moisture barrier formed at least in part by a nitride layer, nowhere does Kinard disclose a nitride layer as a moisture barrier. Therefore, the **rearrangement of the layers** as suggested by the Examiner is clearly without support in the Kinard reference, and therefore the obviousness conclusion is improper.

This conclusion is further supported by M.P.E.P. § 2144.5, which states that "[t]he mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art **must provide a motivation or reason** for the worker in the art, without the benefit of appellant's specification, **to make the necessary changes** in the reference device." (Emphasis added, *quoting* Ex parte Chicago Rawhide Mfg., 223 U.S.P.Q. 351, 353). The only suggestion to use **a nitride layer as a moisture barrier** comes from

Applicants's specification, and, pursuant to the holding in Ex parte Chicago Rawhide Mfg., the obviousness conclusion is improper.

The addition of Sato does not cure this critical deficiency of Kinard. The Sato reference purportedly concerns a flow sensor for measuring a flow rate of a fluid based on a difference between voltages output by two temperature-sensitive heating portions. (*See* Sato, Abstract). In one embodiment, the flow sensor of Sato includes a square-shaped substrate with a hollow cavity extending along the length of the substrate. (*See* Sato, col. 3, lines 45-50). A supporting portion is diagonally arranged within the cavity, thereby dividing the cavity into two side openings. (*See* Sato, col. 3, lines 50-54). Arranged on the supporting portion are three thin-film heating elements, which are formed by etching a silicon carbide film deposited on the square-shaped substrate. (*See* Sato, col. 4, lines 16-26). These three heating elements are configured to form a first and a second heating portions.

With respect to amended claim 1, which includes the features of cancelled claim 2, neither Kinard nor Sato, whether considered individually or in combination, discloses a moisture barrier made of nitride. The Kinard reference discloses only a silicon dioxide layer, which is not alleged to prevent penetration of moisture, and Sato discloses no protective barrier whatsoever, much less "a moisture barrier" made of silicon nitride. For at least these reasons, claim 1 is allowable over the combination of Kinard and Sato.

Claim 6 depends from claim 1, and is therefore allowable for at least the same reasons discussed above supporting the patentability of claim 1. Additonally, neither Kinard nor Sato, whether considered individually or in combination, discloses a moisture barrier "formed at least in part by at least one of a top sandwich system and a bottom sandwich system," in which "at least one of the top sandwich system and the bottom sandwich system includes at least one silicon carbide layer," as recited in claim 6. As regards Kinard, this reference does not disclose or teach the use of silicon carbide for any purpose whatsoever, much less for the purpose of providing a "moisture barrier." As regards Sato, although this reference discusses the etching of a silicon carbide layer to form three heating elements, the reference fails to disclose the use of silicon carbide to form a **moisture barrier** arranged above a metal layer. Considering that the primary purpose of a moisture barrier, for example, a moisture barrier made of silicon carbide, is to prevent the penetration of moisture into the sensor membrane, etching the silicon carbide layer of Sato to produce the heating elements would presumably permit moisture to penetrate the substrate of Sato. That is, after the silicon carbide is etched away, moisture may penetrate the substrate of Sato in areas not occupied by

the heating elements. As such, the etched silicon carbide of Sato cannot be considered a "moisture barrier" made of silicon carbide, as recited in claim 6.

Since neither Kinard nor Sato discusses the use of a silicon carbide moisture barrier, there is simply no motivation, suggestion or expectation of success to modify Kinard with the silicon carbide layer of Sato in the manner contemplated by claim 6. For at least these reasons, claim 6 is allowable over Kinard and Sato.

Claims 3 and 12 depend from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable.

For at least the foregoing reasons, it is kindly requested that the rejections of claims 1, 3, 6 and 12 under 35 U.S.C. § 103(a) be withdrawn.

III. NEW CLAIMS 19-23 ARE ALLOWABLE

Claim 19 recites the feature that at least one of a top sandwich system including at least one first silicon oxide layer between **at least two first silicon nitride layers** is formed above the metal layer, and a bottom sandwich system including at least one second silicon oxide layer between **at least two second silicon nitride layers** is provided below the metal layer. The Kinard reference discloses only a silicon dioxide layer, not a nitride layer. The Sato reference discloses no sandwich system whatsoever, much less "a sandwich system" including a layer of silicon nitride. Therefore, claim 19 and claims 20-23, which depend from claim 19, are allowable over Kinard and Sato, whether considered individually or in combination.

CONCLUSION

Applicants respectfully submit that all of the pending claims of the present application are now in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

Dated: 2/24/03

By: [signature] (by [signature] Reg. No. 36,197)
Richard L. Mayer
Reg. No. 22,490

KENYON & KENYON
One Broadway
New York, New York 10004
(212) 425-7200
CUSTOMER NO. 26646

26646
PATENT TRADEMARK OFFICE

AMENDMENT VERSION WITH MARKINGS

IN THE CLAIMS:

Claims 1, 3, and 8 to 12 have been amended without prejudice as follows:

1. (Once Amended) A mass flow sensor, comprising:

a frame formed at least in part by silicon;

a membrane held by the frame;

a metal layer including a first structure and a second structure and being arranged above the frame;

a heating element formed by the first structure in the metal layer;

at least one temperature measurement element formed by the second structure in the metal layer; and

a moisture barrier arranged above the metal layer and formed at least in part by a nitride layer.

3. (Once Amended) The mass flow sensor according to claim [2] 1, wherein:

the nitride layer is a silicon nitride layer.

8. (Once Amended) The mass flow sensor according to claim 1, further comprising:

a further nitride layer arranged between the frame and the metal layer.

9. (Once Amended) The mass flow sensor according to claim 8, further comprising:

a silicon oxide layer formed by a thermal oxidation and arranged between the further nitride layer.

10. (Once Amended) The mass flow sensor according to claim 9, wherein:

the further nitride layer includes a silicon nitride layer.

11. (Once Amended) The mass flow sensor according to claim 9, further comprising:

an oxide layer arranged in a recess area beneath the further nitride layer.

12. (Twice Amended) The mass flow sensor according to claim 9, further comprising:

an oxide layer arranged in the membrane and below the metal layer; and

a recess arranged beneath the further nitride layer;

AMENDMENT VERSION WITH MARKINGS

wherein the recess does not contain the oxide layer.